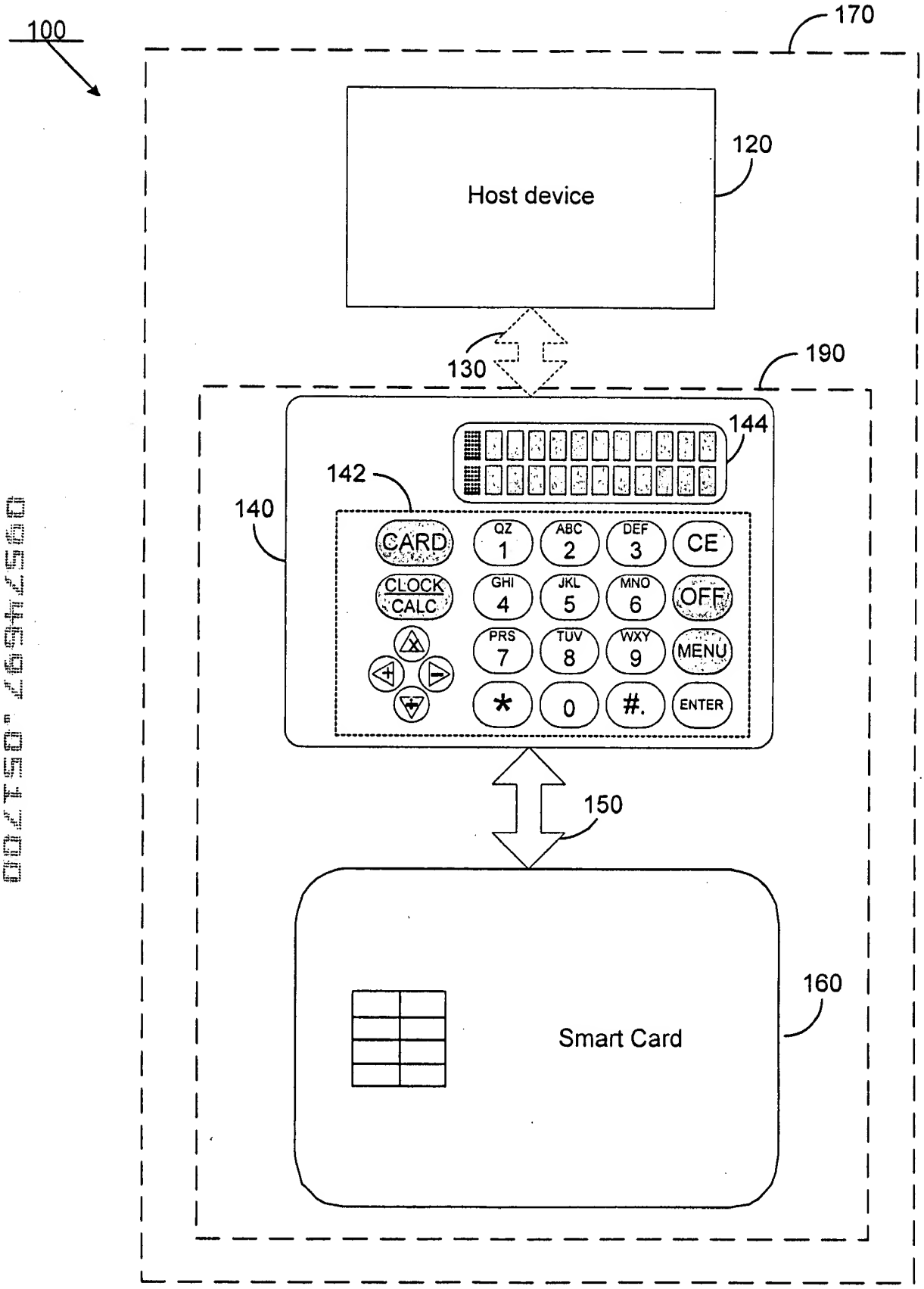

100
170
Host device
120
130
190
144
142
140
CARD
QZ 1
ABC 2
DEF 3
CE
CLOCK CALC
GHI 4
JKL 5
MNO 6
OFF
PRS 7
TUV 8
WXY 9
MENU
* 0 #.
ENTER
150
Smart Card
160

Fig. 1

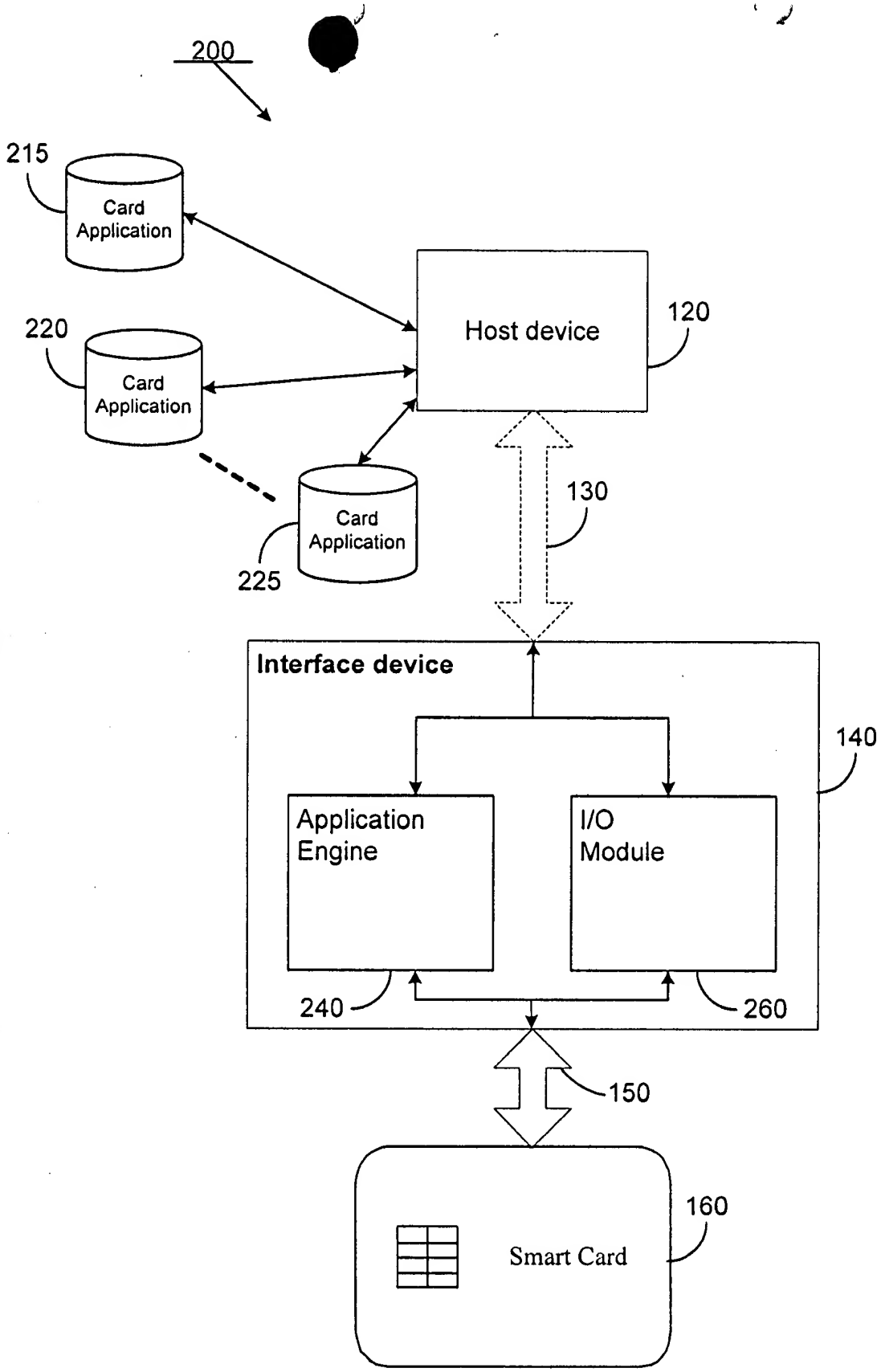

200
215
Card Application
220
Card Application
225
Card Application
Host device
120
130
Interface device
140
Application Engine
I/O Module
240
260
150
160
Smart Card

Fig. 2

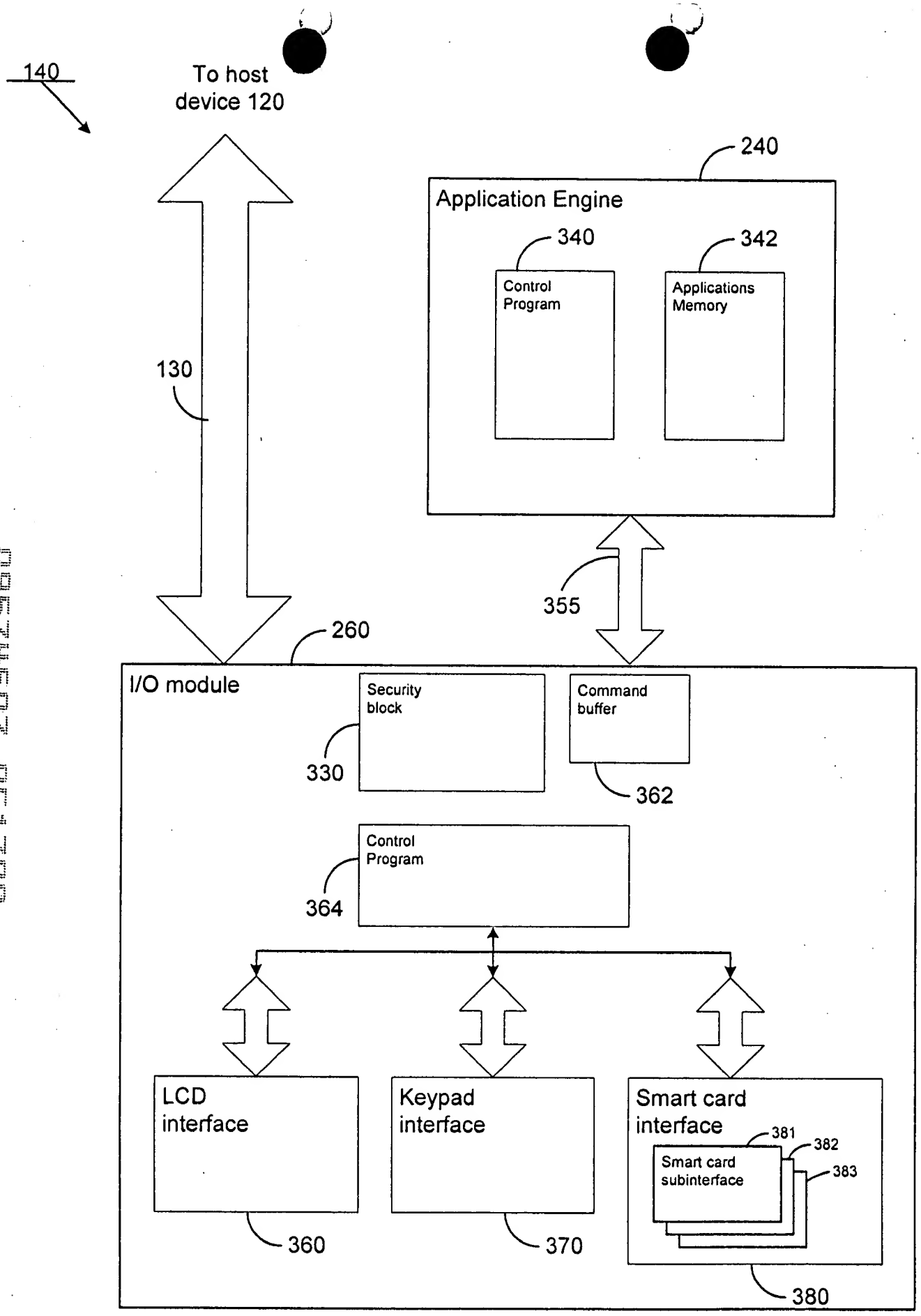

140
To host device 120
240
Application Engine
340
Control Program
342
Applications Memory
130
355
260
I/O module
Security block
330
Command buffer
362
Control Program
364
LCD interface
360
Keypad interface
370
Smart card interface
381
382
383
Smart card subinterface
380

Fig. 3

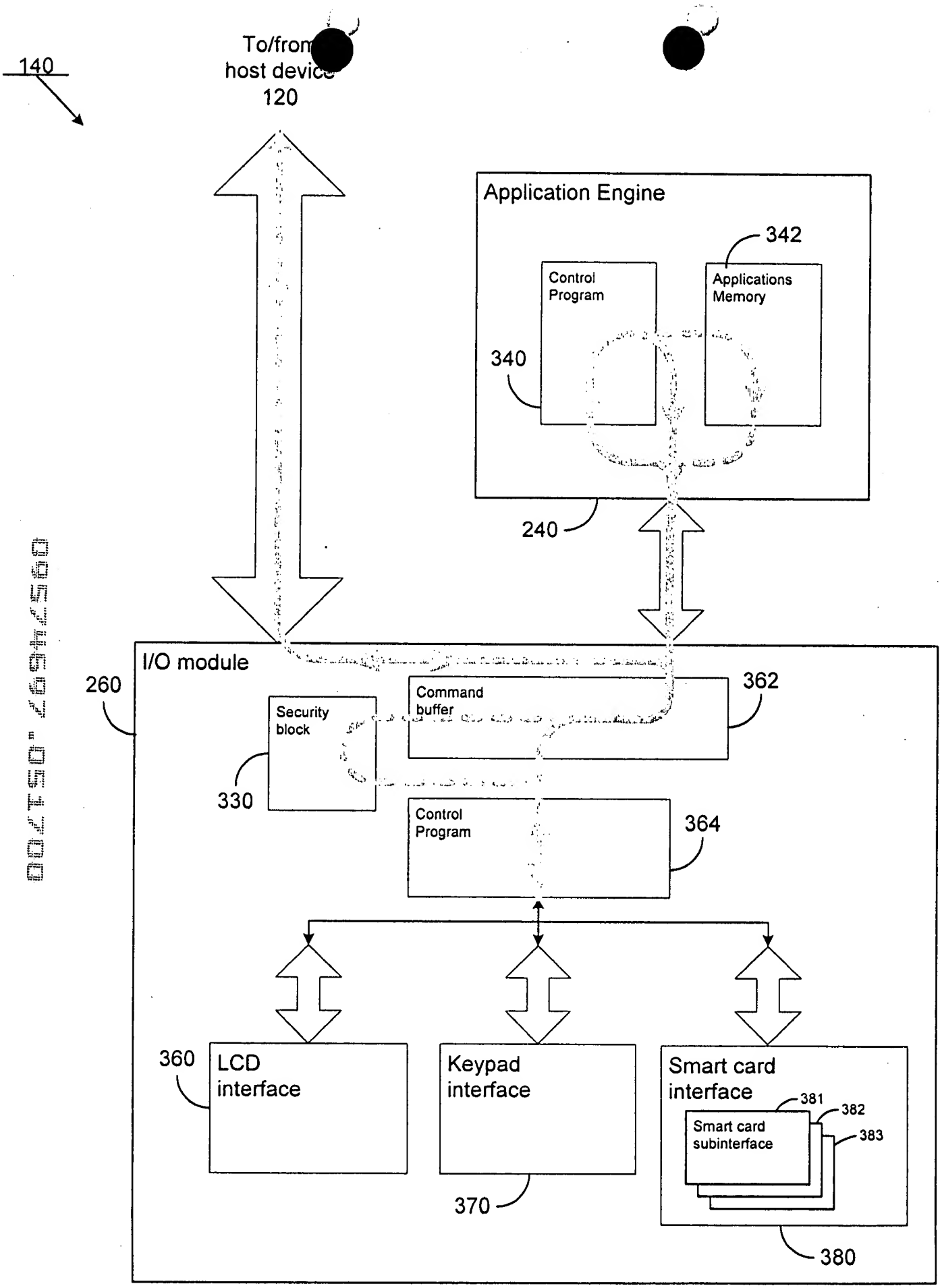

140
To/from host device 120
Application Engine
342
Control Program
Applications Memory
340
240
I/O module
260
362
Command buffer
Security block
330
Control Program
364
360
LCD interface
Keypad interface
Smart card interface
381
382
383
Smart card subinterface
370
380

Fig. 4

Host Connected Mode Flowchart

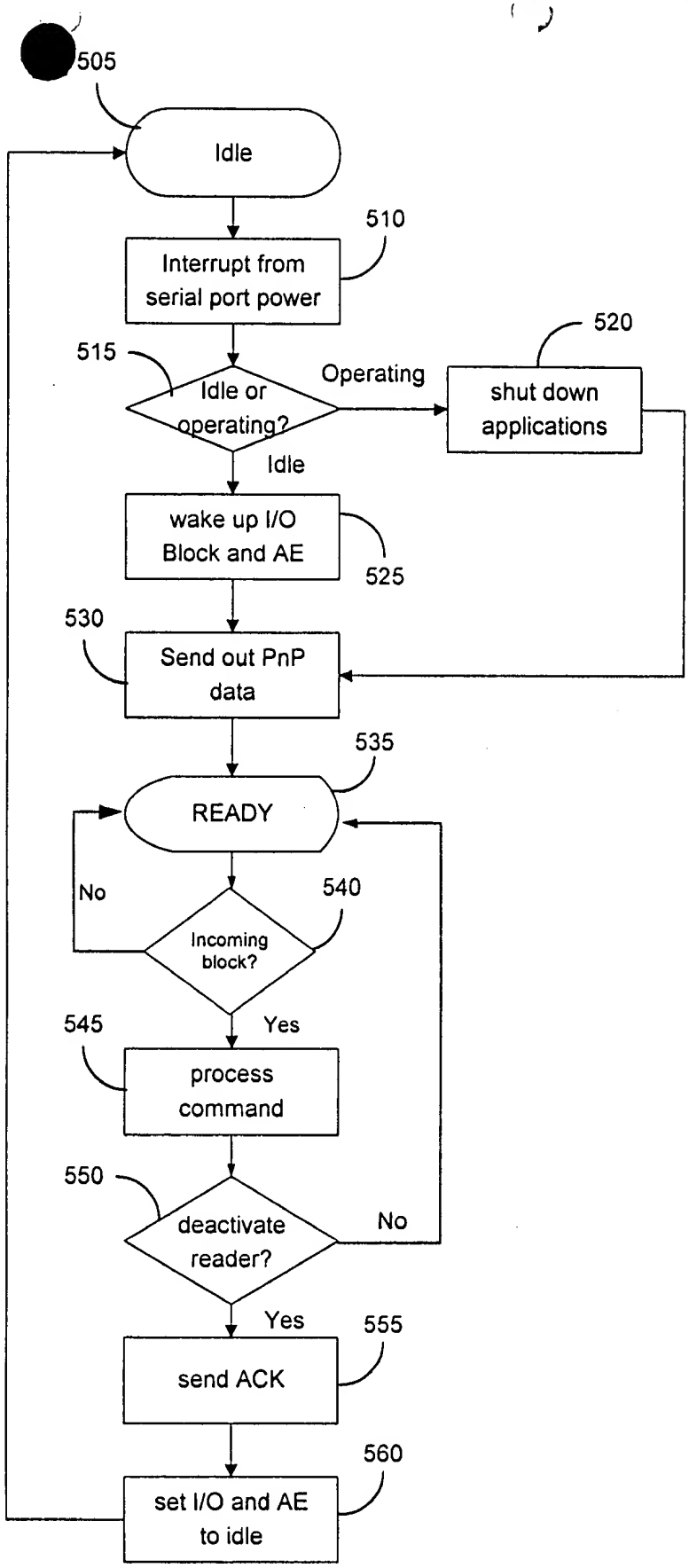


Fig. 5

09574697 - 052700

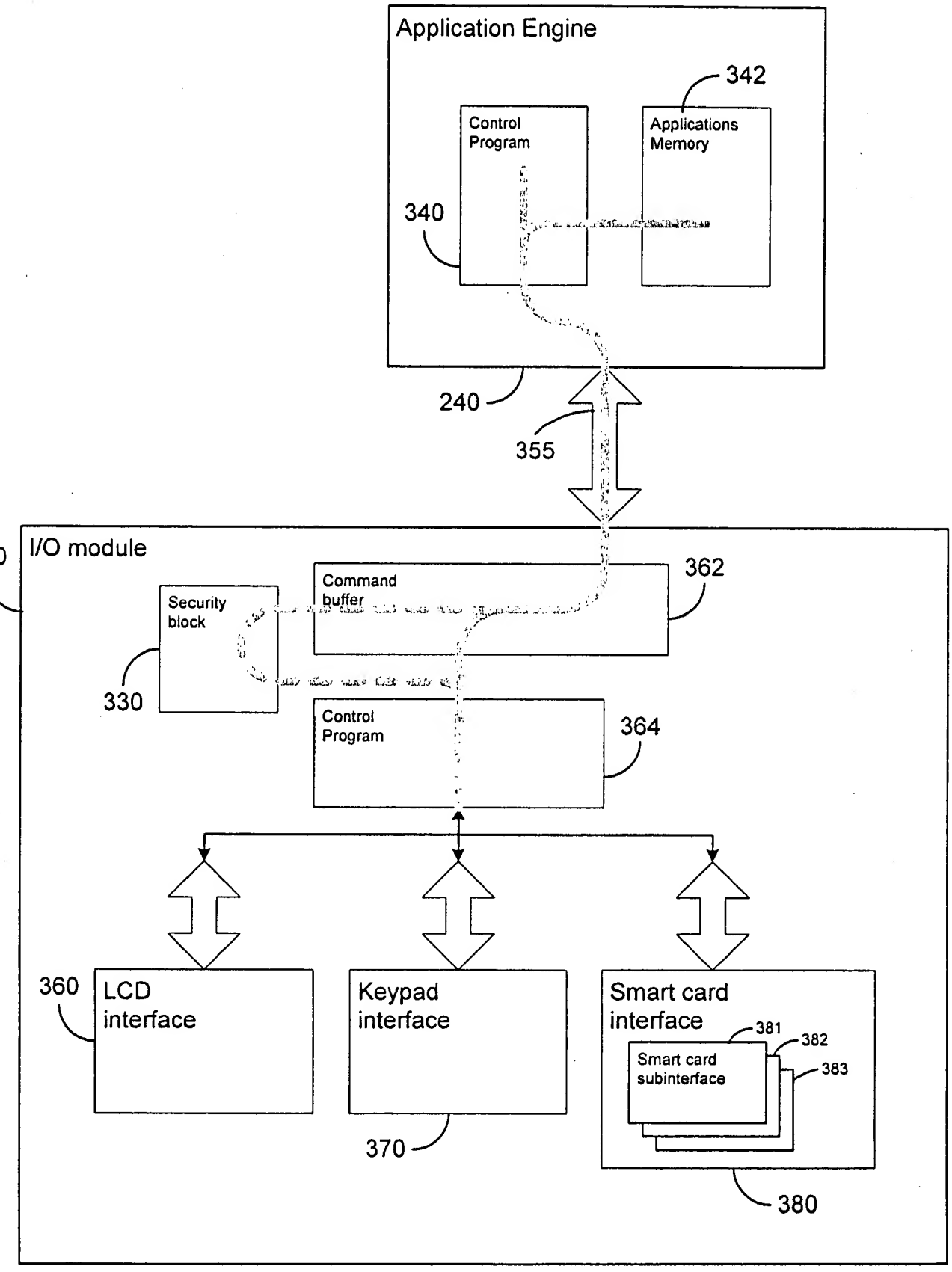

140
Application Engine
342
Control Program
Applications Memory
340
240
355
260
I/O module
Command buffer
362
Security block
330
Control Program
364
360
LCD interface
Keypad interface
Smart card interface
381
382
383
Smart card subinterface
370
380

Fig. 6

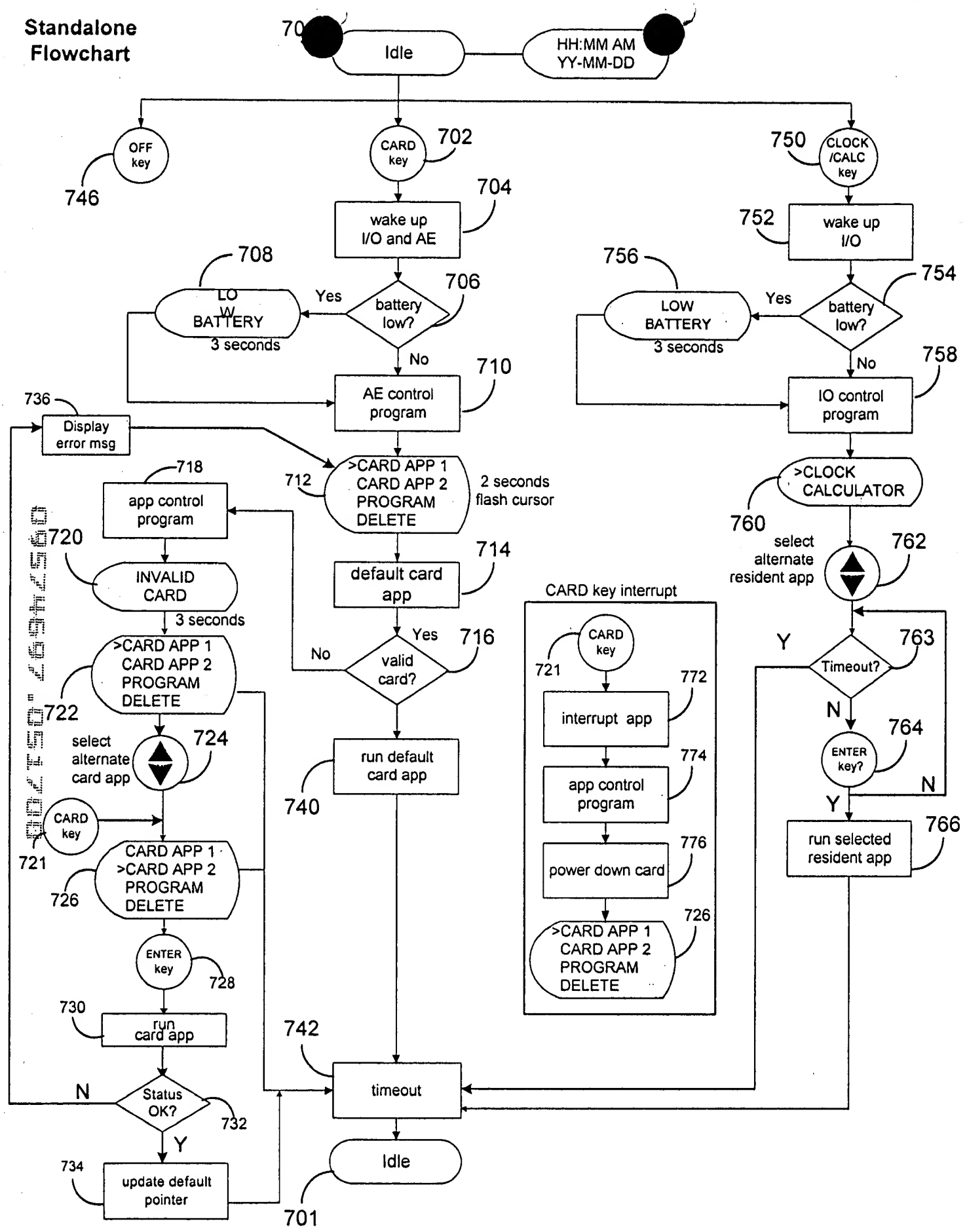

Standalone Flowchart
Idle
HH:MM AM
YY-MM-DD
OFF key
746
CARD key
702
704
wake up I/O and AE
708
LOW BATTERY
3 seconds
Yes
battery low?
706
No
710
AE control program
736
Display error msg
718
app control program
720
INVALID CARD
3 seconds
>CARD APP 1
CARD APP 2
PROGRAM
DELETE
722
select alternate card app
724
CARD key
721
CARD APP 1
>CARD APP 2
PROGRAM
DELETE
726
ENTER key
728
730
run card app
N
Status OK?
732
Y
734
update default pointer
712
>CARD APP 1
CARD APP 2
PROGRAM
DELETE
2 seconds flash cursor
714
default card app
No
Yes
valid card?
716
740
run default card app
742
timeout
701
Idle
CARD key interrupt
721
CARD key
772
interrupt app
774
app control program
776
power down card
726
>CARD APP 1
CARD APP 2
PROGRAM
DELETE
750
CLOCK /CALC key
752
wake up I/O
756
LOW BATTERY
3 seconds
Yes
754
battery low?
No
758
IO control program
>CLOCK
CALCULATOR
760
select alternate resident app
762
Y
763
Timeout?
N
764
ENTER key?
N
Y
766
run selected resident app

Fig. 7

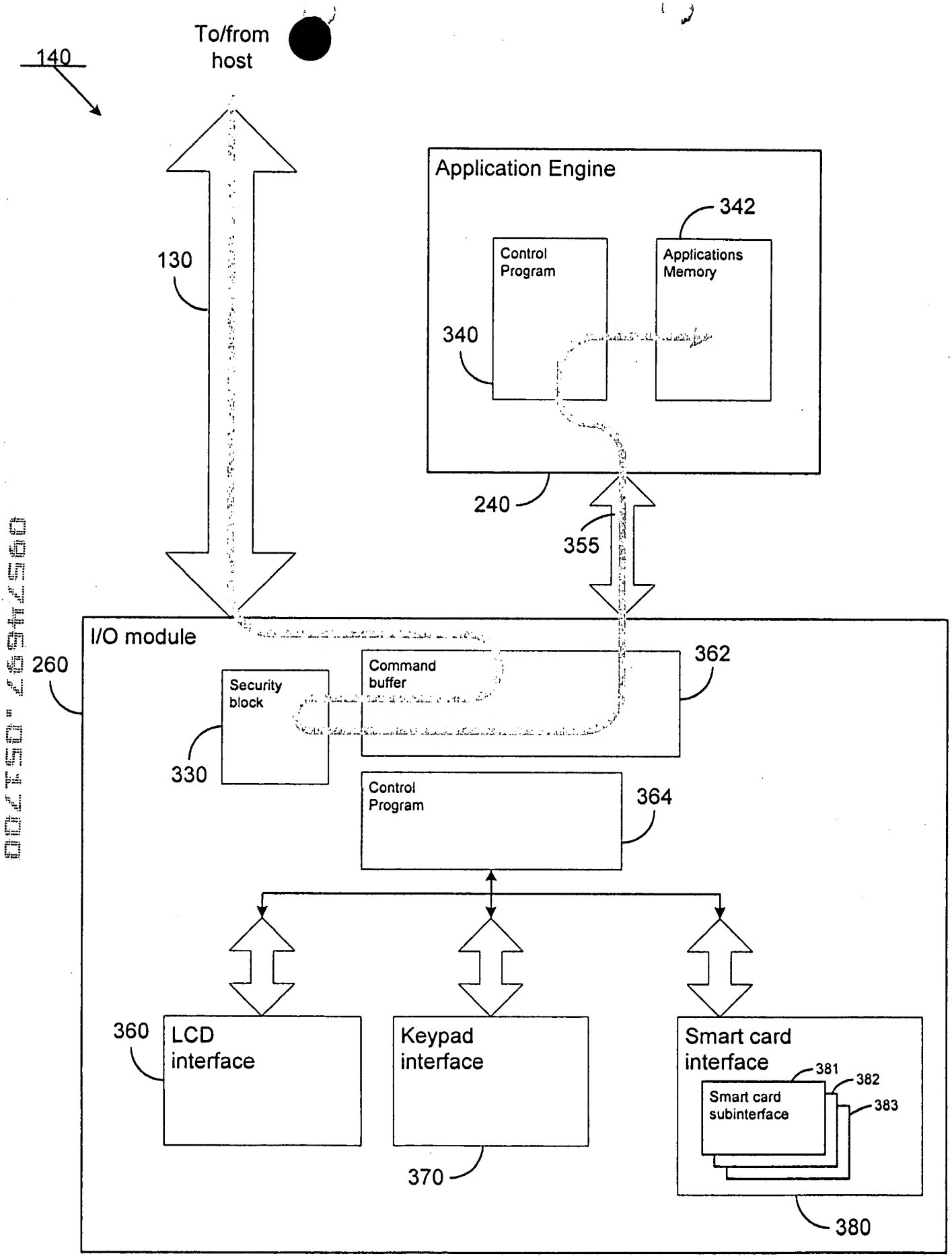

140
To/from host
130
Application Engine
342
Control Program
Applications Memory
340
240
355
I/O module
260
Command buffer
362
Security block
330
Control Program
364
360
LCD interface
Keypad interface
370
Smart card interface
381
382
383
Smart card subinterface
380

Fig. 8a

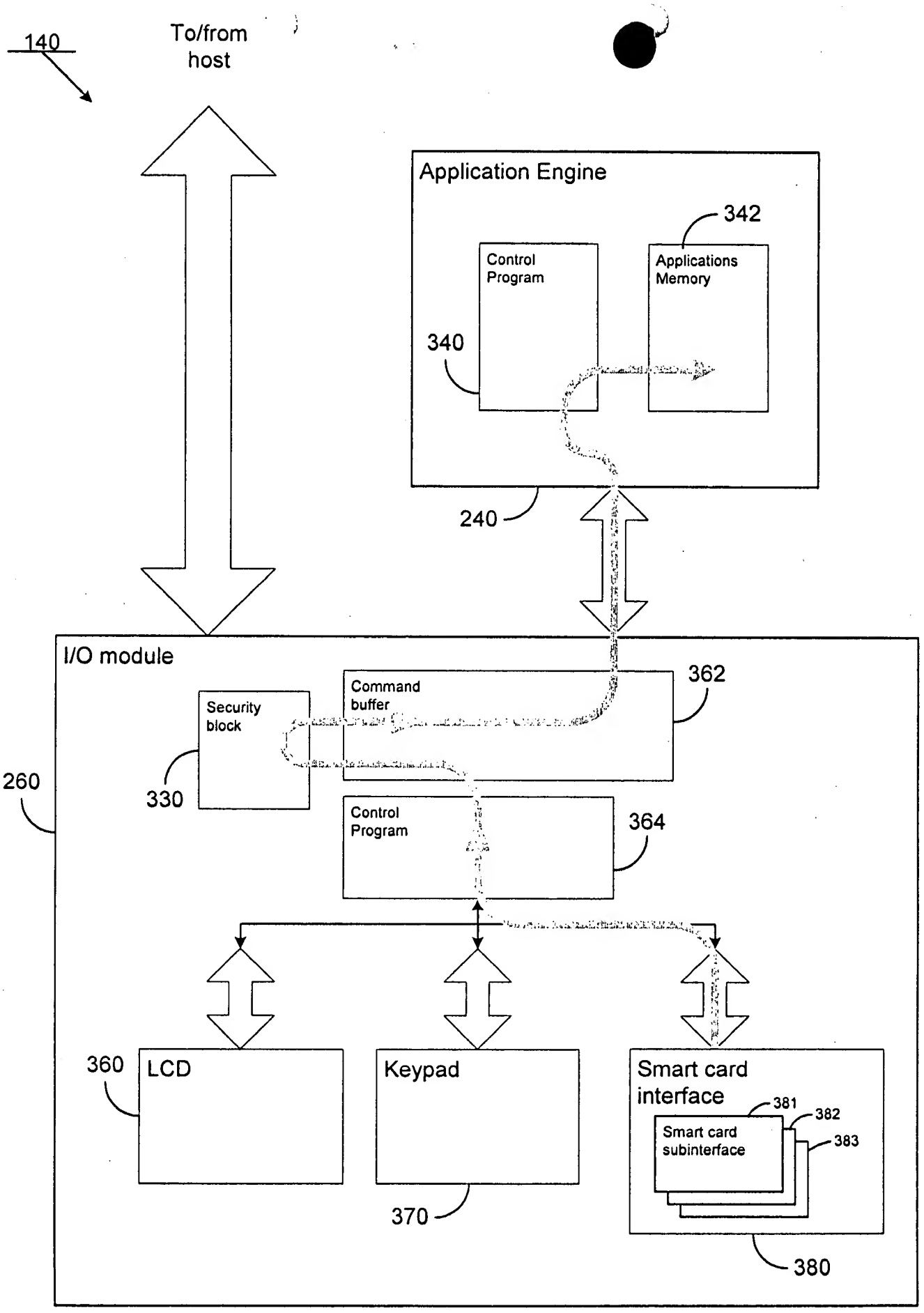

140
To/from host
Application Engine
342
Control Program
Applications Memory
340
240
I/O module
362
Command buffer
Security block
330
260
Control Program
364
360
LCD
Keypad
Smart card interface
381
382
383
Smart card subinterface
370
380

Fig. 8b

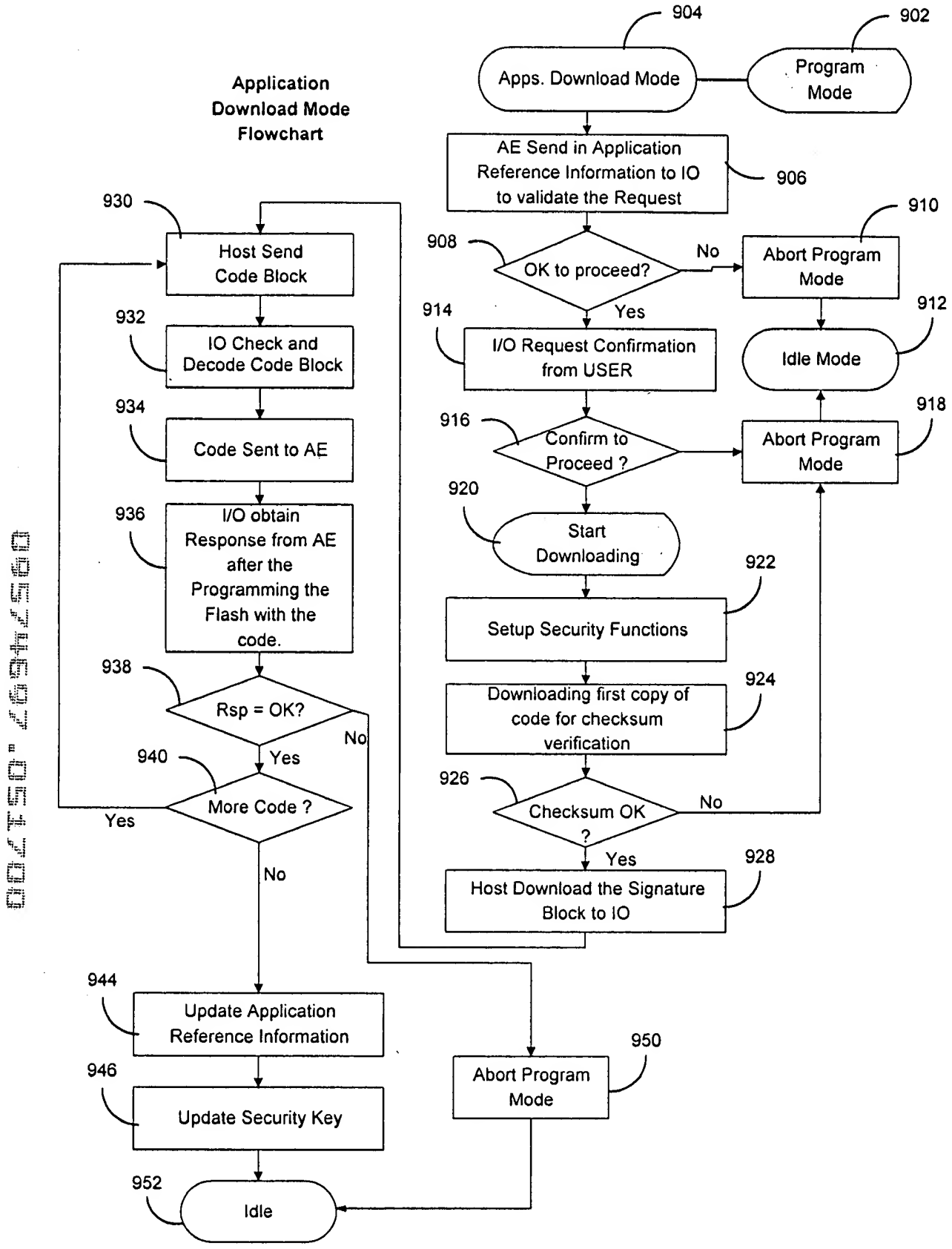

Application Download Mode Flowchart
904
902
Apps. Download Mode
Program Mode
AE Send in Application Reference Information to IO to validate the Request
906
930
Host Send Code Block
908
OK to proceed?
No
910
Abort Program Mode
Yes
914
I/O Request Confirmation from USER
912
Idle Mode
932
IO Check and Decode Code Block
916
Confirm to Proceed ?
918
Abort Program Mode
934
Code Sent to AE
920
Start Downloading
936
I/O obtain Response from AE after the Programming the Flash with the code.
922
Setup Security Functions
938
Rsp = OK?
No
924
Downloading first copy of code for checksum verification
Yes
940
More Code ?
926
Checksum OK ?
No
Yes
Yes
928
Host Download the Signature Block to IO
No
944
Update Application Reference Information
950
Abort Program Mode
946
Update Security Key
952
Idle

Fig. 9

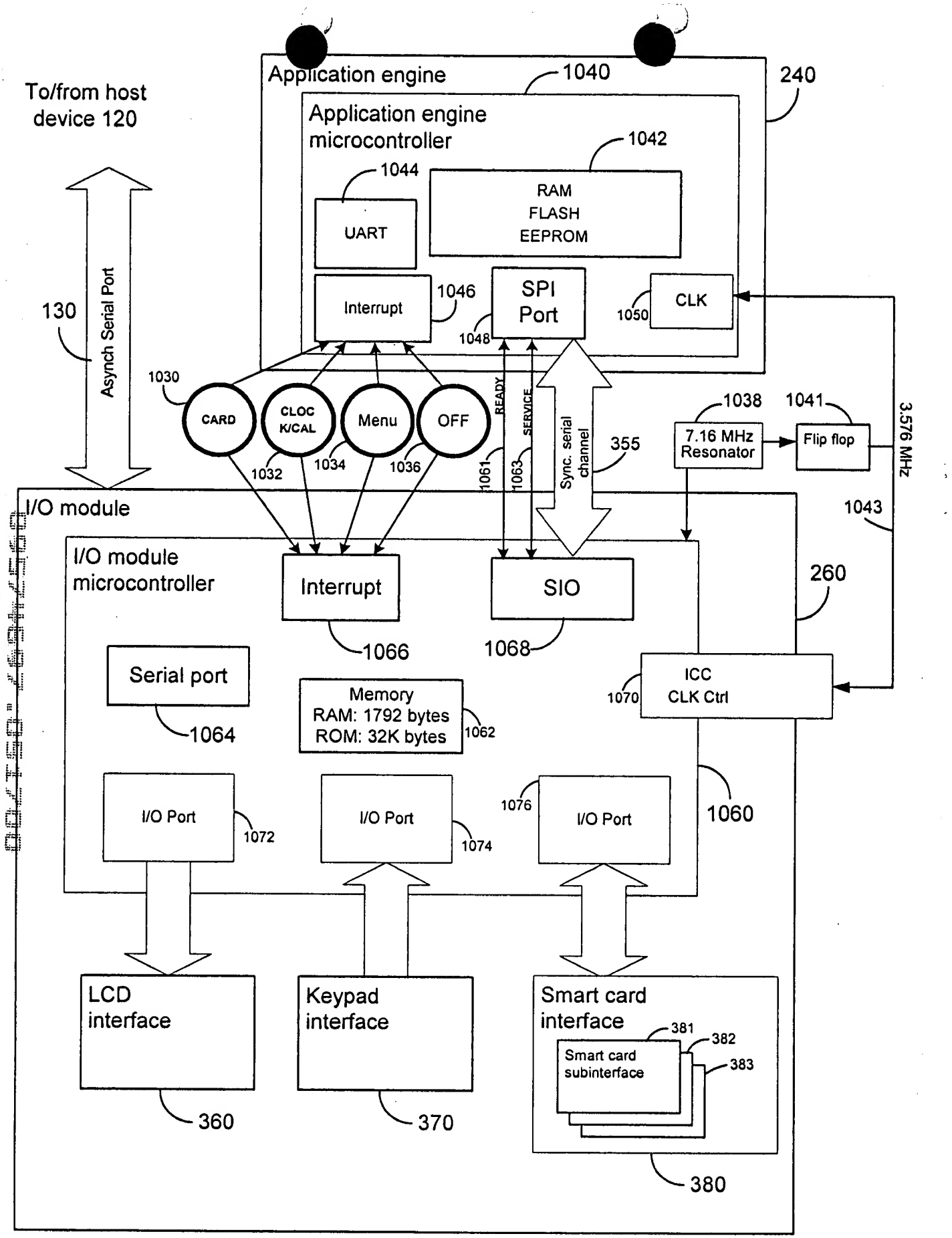

To/from host device 120
Application engine
1040
240
Application engine microcontroller
1042
1044
UART
RAM
FLASH
EEPROM
Interrupt
1046
SPI Port
1048
CLK
1050
130
Asynch Serial Port
1030
CARD
CLOC K/CAL
Menu
OFF
1032
1034
1036
READY
SERVICE
1061
1063
Sync. serial channel
355
1038
7.16 MHz Resonator
1041
Flip flop
3.576 MHz
I/O module
1043
I/O module microcontroller
Interrupt
SIO
260
1066
1068
Serial port
1064
Memory
RAM: 1792 bytes
ROM: 32K bytes
1062
ICC
CLK Ctrl
1070
I/O Port
1072
I/O Port
1074
1076
I/O Port
1060
LCD interface
360
Keypad interface
370
Smart card interface
381
382
383
Smart card subinterface
380

Fig. 10

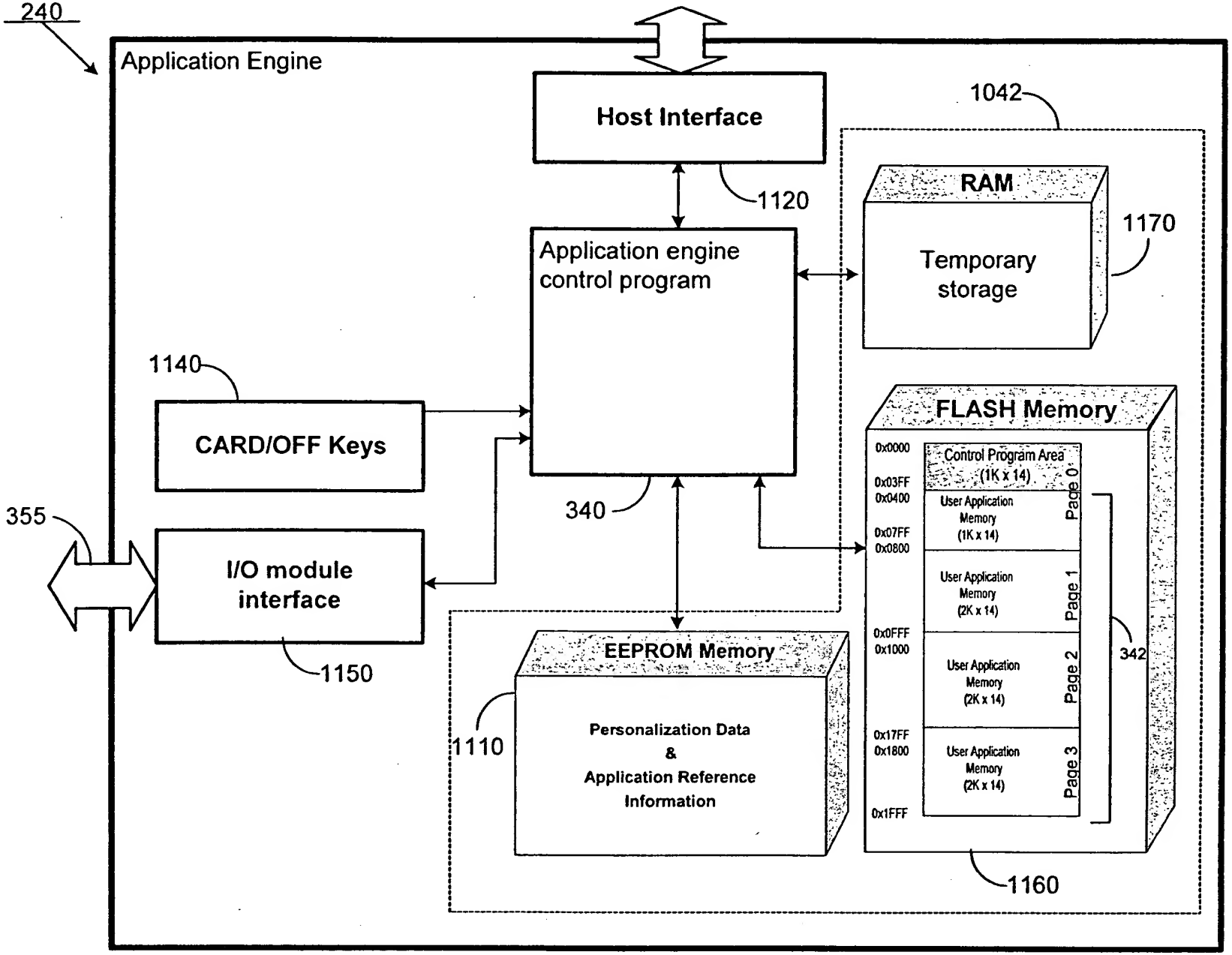

240
Application Engine
Host Interface
1042
1120
RAM
Temporary storage
1170
Application engine control program
1140
CARD/OFF Keys
355
I/O module interface
1150
340
FLASH Memory
0x0000
0x03FF
0x0400
0x07FF
0x0800
0x0FFF
0x1000
0x17FF
0x1800
0x1FFF
Control Program Area (1K x 14)
User Application Memory (1K x 14)
User Application Memory (2K x 14)
User Application Memory (2K x 14)
User Application Memory (2K x 14)
Page 0
Page 1
Page 2
Page 3
342
EEPROM Memory
1110
Personalization Data & Application Reference Information
1160

Fig. 11

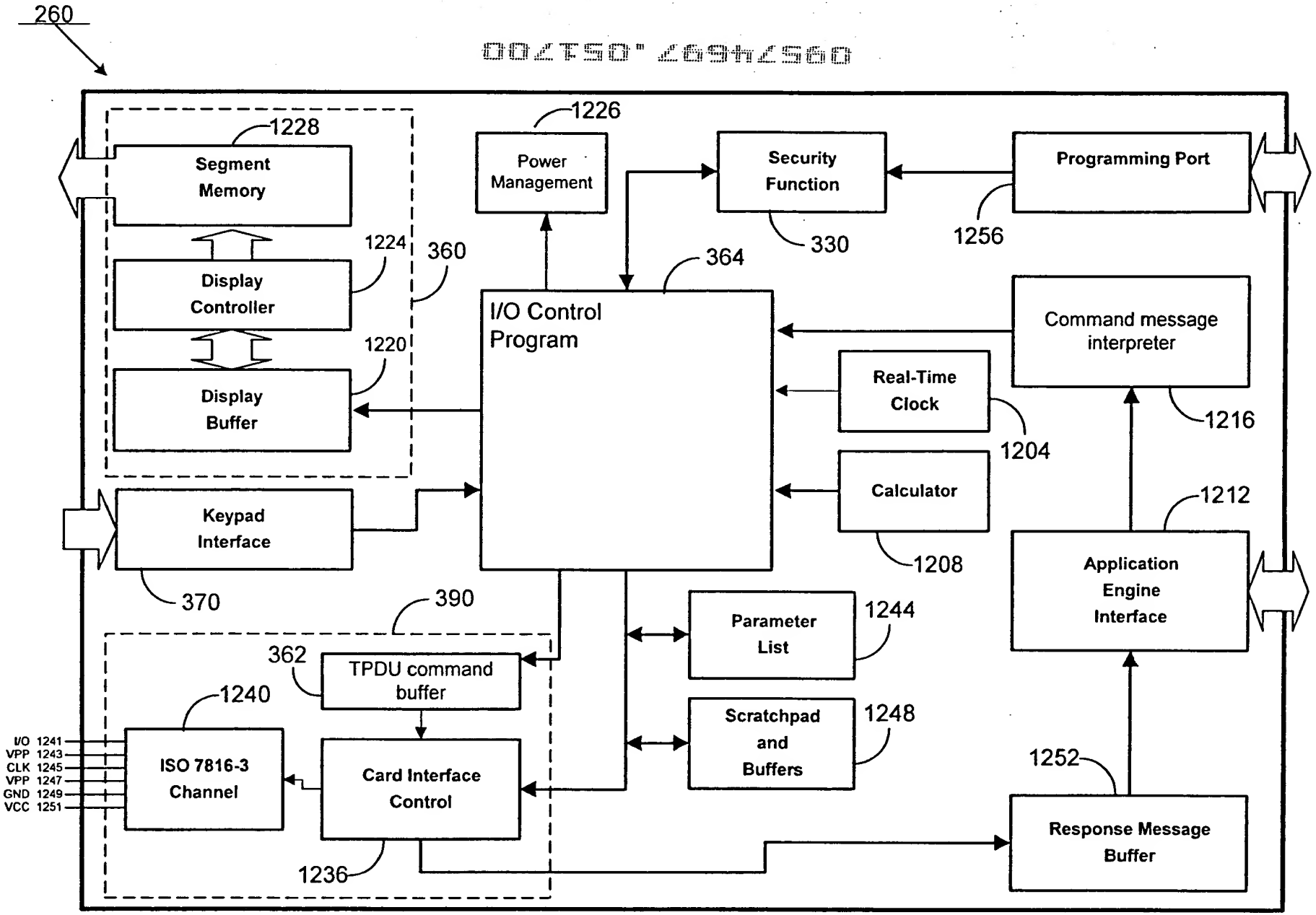

260
1228
Segment Memory
1226
Power Management
Security Function
Programming Port
330
1256
1224
360
364
Display Controller
I/O Control Program
Command message interpreter
1220
Display Buffer
Real-Time Clock
1204
1216
Calculator
1208
1212
Keypad Interface
370
390
Application Engine Interface
Parameter List
1244
362
TPDU command buffer
1240
Scratchpad and Buffers
1248
I/O 1241
VPP 1243
CLK 1245
VPP 1247
GND 1249
VCC 1251
ISO 7816-3 Channel
Card Interface Control
1252
Response Message Buffer
1236

Fig. 12

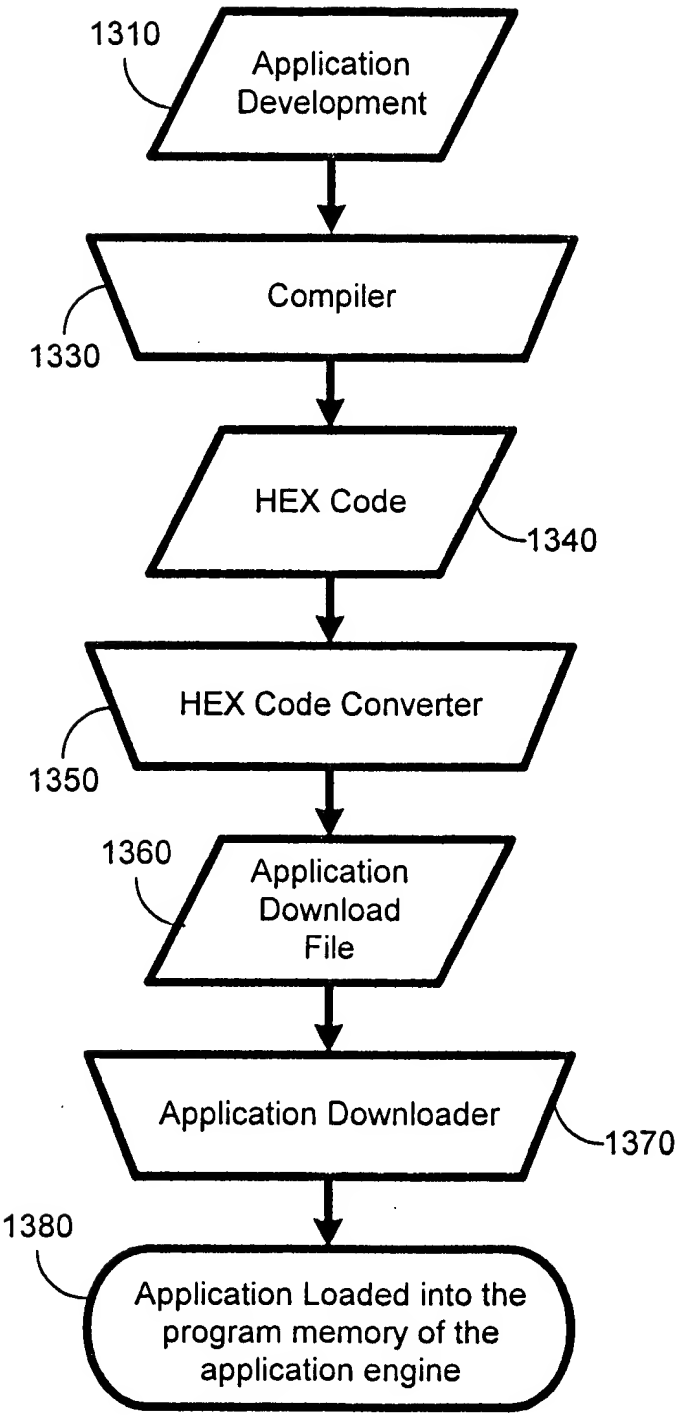
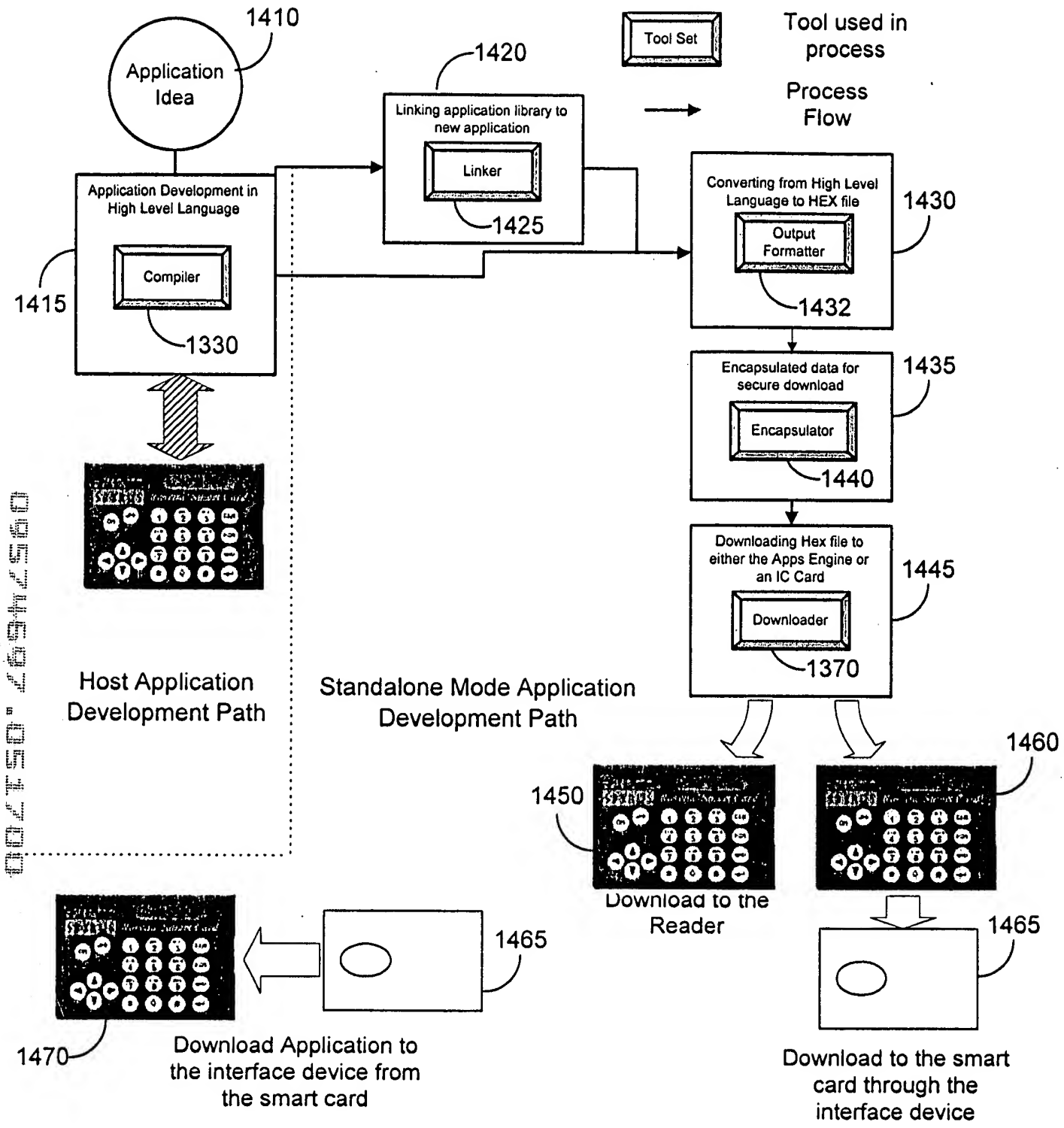

1310
Application Development
Compiler
1330
HEX Code
1340
HEX Code Converter
1350
1360
Application Download File
Application Downloader
1370
1380
Application Loaded into the program memory of the application engine

Fig. 13



Application Development Environment for the Reloadable Reader

Fig. 14